DEPARTMENT OF CIVIL ENGINEERING AND ENVIRONMENTAL ENGINEERING

Ashok Kumar, Professor and Chair
Nitschke Hall Room 3006
Phone: 419.530.8115
Fax: 419.530.8116
ashok.kumar@utoledo.edu

Bryan Bosch, Assistant Director of Dept. Student Services
bryanbosch@utoledo.edu

As a department that celebrates human diversity, we advance civil engineering knowledge, solutions, and practices through research and education of civil engineers who:

- have a balanced, integrated, and state-of-the-art education
- are creative, independent, and practical thinkers
- are world-class leaders, designers, and entrepreneurs

Degrees Offered

- BS in Civil Engineering (http://utoledo-public.courseleaf.com/undergraduate/engineering/civil-environmental-engineering/bs-civil-engineering)
- BS in Environmental Engineering (http://utoledo-public.courseleaf.com/undergraduate/engineering/civil-environmental-engineering/bs-environmental-engineering)

CIVE 1000 Freshman Civil Engineering Experience
[0-1 credit hours (2, 0, 0)]
Computer literacy, report writing, word processing, table creation, equation, equation writing, data manipulation, data graphical plotting. Introduction to various disciplines in Civil Engineering, Structural, Geotechnical, Transportation, Environmental. Practice in engineering problem solving process.

Term Offered: Fall

CIVE 1100 Civil Engineering Measurements
[0-3 credit hours (0, 6, 2)]

Corequisites: CIVE 1110

Term Offered: Spring, Fall

CIVE 1110 Computer Aided Drafting for Civil Engineers
[1 credit hour (0, 1, 0)]
Study of graphical representation of engineering structures and systems and application by hand-drawing and computer aided techniques.

Corequisites: CIVE 1100

Term Offered: Spring, Fall

CIVE 1150 Engineering Mechanics: Statics
[3 credit hours (3, 0, 0)]
Study of coplanar statics of particles, vector addition, resultant components, equilibrium, free body diagrams, equivalent force systems, vector products, scalar products, 2 & 3 dimensional equilibrium of rigid bodies, analysis of machines, pulleys, trusses. Centroids, moments of inertia, shear and bending moment diagrams.

Prerequisites: (MATH 1850 with a minimum grade of D- and PHYS 2130 with a minimum grade of D-) or (MATH 1920 with a minimum grade of D- and PHYS 2130 with a minimum grade of D-)

Term Offered: Spring, Summer, Fall

CIVE 1160 Engineering Mechanics: Strength Of Materials
[3 credit hours (3, 0, 0)]

Prerequisites: CIVE 1150 with a minimum grade of D-

Term Offered: Spring, Summer, Fall

CIVE 1170 Fluid Mechanics For Civil Engineers
[3 credit hours (0, 0, 3)]
Fundamental concepts of fluid mechanics. Use of hydrostatics, continuity, momentum and energy equations to slove fluid problems applied to pipe flow, open channel flow and boundary layer flow. Introduction to turbo machinery.

Prerequisites: PHYS 2130 with a minimum grade of D-

Term Offered: Spring

CIVE 2000 Professional Development
[1 credit hour (1, 0, 0)]
Basic concepts of career planning, co-op performance expectations, necessary skills for maximizing learning from experiences and realities of the professional community.

Prerequisites: CIVE 1000 with a minimum grade of D-

Term Offered: Spring

CIVE 2110 Civil Engineering Materials With Laboratory
[0-3 credit hours (0, 2, 2)]
Introduction to properties of aggregates, Portland cement, concrete, steel, glass and bituminous mixtures. Mix designs of cement and asphalt concrete and standard test procedures for strength, workability, serviceability and durability.

Prerequisites: CIVE 1160 with a minimum grade of D-

Term Offered: Spring, Fall

CIVE 2550 Sustainability Problem Solving
[1 credit hour (1, 0, 1)]
Teams of students work as part of an enterprise to address real-world engineering design projects or problems. Develops group problem-solving skills. Stresses interpersonal, project management, and action planning skills. Frames the problem from a systems and sustainability perspective including the technical, social, economic, and environmental dimensions and solutions of the problem. Students have the option to start a new enterprise or join an existing one from previous cohorts. This course may be repeated for credit.

Term Offered: Spring, Summer, Fall
CIVE 2990 Individual Study In Civil Engineering [1-3 credit hours (0, 0, 0-3)]
An opportunity for qualified underclassmen to pursue a relevant area of Civil Engineering of particular personal interest under the supervision of a faculty member.
Term Offered: Summer, Fall

CIVE 3120 Civil Engineering Systems Analysis [3 credit hours (0, 0, 3)]
Systems Approach, optimization by differential calculus techniques, linear programming, transportation and assignment problems, management of construction projects, critical path method, PERT and decision analysis.
Prerequisites: MATH 3860 with a minimum grade of D- or MATH 2860 with a minimum grade of D- or MATH 3820 with a minimum grade of D-
Term Offered: Summer, Fall

CIVE 3210 Soil Mechanics [0-3 credit hours (0, 2, 2)]
A study of soil as an engineering material. Geologic origins, physical properties, movement of water through soil, soil stresses, consolidation, shear strength. Engineering properties testing of soils in laboratory.
Prerequisites: CIVE 1160 with a minimum grade of D- and CIVE 1170 with a minimum grade of D-
Term Offered: Fall

CIVE 3220 Foundation Engineering [3 credit hours (3, 0, 0)]
Application of soil mechanics principles to design for problems encountered in excavations, embankments, foundations, retaining structures, abutments, slope stability. Evaluation of the ability of soil to function in various capacities.
Prerequisites: CIVE 3210 with a minimum grade of D-
Term Offered: Summer

CIVE 3310 Structural Analysis [3 credit hours (0, 0, 3)]
Analysis of statically determinate structures; analysis of simple and compound trusses, beams and frames; introduction to indeterminate structures; slope deflection and moment distribution. Introduction to computer applications.
Prerequisites: CIVE 1160 with a minimum grade of D- and MATH 1890 with a minimum grade of D- or MATH 2890 with a minimum grade of D-
Term Offered: Summer

CIVE 3410 Steel Design I [3 credit hours (0, 0, 3)]
An introduction to the principles underlying design of axial tension members, axial compression members, beams, columns and base plates. Also includes welded and bolted connections.
Prerequisites: CIVE 3310 with a minimum grade of D-
Term Offered: Summer

CIVE 3420 Reinforced Concrete Design I [3 credit hours (0, 0, 3)]
Introduction to principles and underlying design of basic structural beams, columns, one-way slabs in reinforced concrete. Shear reinforcement.
Prerequisites: CIVE 3310 with a minimum grade of D-
Term Offered: Spring, Fall

CIVE 3510 Transportation Engineering I [3 credit hours (0, 0, 3)]
To provide an overview of transportation systems and operating characteristics of various highway modes. Concept of land use/transportation interaction. Considerations of vehicle and human characteristics in design of highway elements. Introduction to highway capacity and traffic control devices. Transportation planning process leading to local area traffic management with introduction to transportation system management and intelligent transportation systems.
Prerequisites: (CIVE 1100 with a minimum grade of D- and MIME 2300 with a minimum grade of D-)  
Term Offered: Fall

CIVE 3520 Transportation Engineering II [3 credit hours (3, 0, 0)]
Survey of various modes of transport with emphasis on service provided by each and facilities required. Introduction to physical and practical aspects of design of transport facilities including drainage, pavements, railroads, ports and harbors, pipelines and transportation terminals.
Prerequisites: (CIVE 3510 with a minimum grade of D- and CIVE 3210 with a minimum grade of D- and CIVE 2110 with a minimum grade of D-)
Term Offered: Summer

CIVE 3610 Water Supply And Treatment [0-3 credit hours (2, 3, 0)]
This course includes lecture, laboratory exercises and a team-based design project. The topics covered will include water quality, water supply, design of the physical and chemical treatment processes, water distribution systems and contemporary issues related to drinking water.
Prerequisites: CIVE 1170 with a minimum grade of D-
Term Offered: Fall

CIVE 3620 Air Pollution Engineering I [3 credit hours (0, 0, 3)]
Introduction to sources of air pollution, basic meteorological processes, air quality modeling, technology for air pollution control, odor control and noise pollution. Introduction to health effects of air pollutants, risk assessment and global atmospheric change. The students are required to use the USEPA programs for stack design and computations for ground level concentrations.
Prerequisites: CIVE 1170 with a minimum grade of D-
Term Offered: Spring

CIVE 3630 Wastewater Engineering [3 credit hours (3, 0, 0)]
This course is focused on wastewater engineering processes. The class format may include lectures, laboratory and field exercises, problem sessions, and team-based design work. The topics covered will include wastewater characterization, collection, treatment process design, discharge, as well as stormwater management and modeling.
Prerequisites: CIVE 1170 with a minimum grade of D-
Term Offered: Spring, Fall

CIVE 3940 Co-Op Experience [1 credit hour (0, 0, 1)]
Approved co-op work experience. Course may be repeated.
Prerequisites: CIVE 2000 with a minimum grade of D-
Term Offered: Spring, Summer, Fall
CIVE 3950 Co-op Experience
[1 credit hour (0, 0, 1)]
Approved co-op work experience beyond third required co-op experience. Course may be repeated.
Prerequisites: CIVE 3940 with a minimum grade of D-
Term Offered: Spring, Summer, Fall

CIVE 4210 Advanced Soil Mechanics
[3 credit hours (3, 0, 0)]
A study of soil behavior including stress distributions, deformation, consolidation and shear strength. The course focuses upon the development and use of well accepted solutions and practical applications.
Prerequisites: CIVE 3210 with a minimum grade of D-

CIVE 4240 Design With Geosynthetics
[3 credit hours (3, 0, 0)]
Use of geosynthetic materials in engineering design for reinforcement, barrier, separation and/or drainage functions. Design applications for geotechnical, transportation and environmental uses.
Prerequisites: (CIVE 3210 with a minimum grade of D- and CIVE 3220 with a minimum grade of D-)

CIVE 4300 Advanced Mechanics Of Materials
[3 credit hours (0, 0, 3)]
Introduction to theory of elasticity, plane-stress and plane-strain problems, yield criteria and failure theories, bending of beams, energy methods, curved flexural members, unsymmetrical bending, torsion, shear center and axisymmetrically loaded members.
Prerequisites: CIVE 1160 with a minimum grade of D- and (MATH 2860 with a minimum grade of D- or MATH 3860 with a minimum grade of D- or MATH 3820 with a minimum grade of D-)

Term Offered: Fall

CIVE 4320 Computer-Aided Analysis of Structures
[3 credit hours (3, 0, 0)]
Matrix analysis of continuous beams, trusses and frames by force method and displacement method. Methods of consistent deformation and slope deflection will be discussed to complement the matrix analysis. Computer applications.
Prerequisites: CIVE 3310 with a minimum grade of D-

CIVE 4340 Experimental Mechanics
[3 credit hours (0, 2, 2)]
Prerequisites: CIVE 2110 with a minimum grade of D-

Term Offered: Spring

CIVE 4430 Structural Steel Design II
[3 credit hours (0, 0, 3)]
Study of local failure in beams, biaxial bending, plate girders, composite beams, semi-rigid composite connections and beam columns.
Prerequisites: CIVE 3410 with a minimum grade of D-

Term Offered: Spring

CIVE 4440 Reinforced Concrete Design II
[3 credit hours (3, 0, 0)]
Prerequisites: CIVE 3420 with a minimum grade of D-

CIVE 4480 Reinforced Masonry Design
[3 credit hours (3, 0, 0)]
Study of the design of reinforced and unreinforced masonry design, beams and walls and columns. Working stress design, strength design and empirical design are studied.
Prerequisites: CIVE 3420 with a minimum grade of D-

Term Offered: Spring, Fall

CIVE 4550 Traffic Control
[3 credit hours (0, 2, 2)]
To provide a detailed understanding of the basic concepts of traffic engineering together with driver-roadway-vehicle system characteristics. Capacity analysis of freeways, rural highways, multilane and two lane highways. Traffic control devices and traffic signal design and capacity. Traffic studies and data collections; volume, speed and travel time, accident and parking studies. Introduction to other tools to mitigate traffic congestion.
Prerequisites: CIVE 3510 with a minimum grade of D-

Term Offered: Fall

CIVE 4610 Hydrology And Water Resources
[3 credit hours (3, 0, 0)]
This course is directed to application of fluid mechanics, hydrology, and hydraulics to the discipline of water resources engineering. Topics covered include flow in closed conduits, flow in open channels, pump systems, surface water hydrology, and computational modeling for hydraulic systems. At the successful completion of this course, the student will learn to apply the fundamental principles to the practical solution of both analysis and design problems in closed and open conduit flows.
Prerequisites: (CIVE 3610 with a minimum grade of D- and MIME 4000 with a minimum grade of D-)

Term Offered: Spring

CIVE 4630 Indoor Air Quality
[3 credit hours (3, 0, 0)]
Characterization of indoor air pollutants, predictions of indoor air quality levels and indoor air quality control. Four to five design problems involving indoor air quality will be discussed/solved in the class. Special emphasis on the indoor radon and asbestos problems in the United States. Use of USEPA program.

Term Offered: Fall

CIVE 4680 Environmental Law
[3 credit hours (3, 0, 0)]
An overview of the major federal environmental statutes: Clean Air Act, Clean Water Act, RCRA, CERCLA, etc. and legal perspective of why they were developed. Exposure to some basic legal principles which will be integrated into the overall study of environmental law. Provides a practical perspective on how the law can be applied to situations encountered by environmental engineers and scientists in the real world.

Term Offered: Fall
CIVE 4690 Sustainability Engineering
[3 credit hours (0, 3, 0)]
Course develops students’ abilities to apply the principles of sustainability to engineered systems. Course topics include sustainability definition and data, life cycle assessment based design, planetary boundaries, greenhouse gas emissions, green construction.

Term Offered: Spring, Fall

CIVE 4710 Advanced Engineering Systems Modeling
[3 credit hours (3, 0, 0)]
A systematic approach to the analysis of complicated engineering system involving uncertain and probabilistic phenomena. Decision-making with multiple objectives, Monte Carlo simulation, reliability based design, and Markov process are studied.

Prerequisites: (CIVE 3120 with a minimum grade of D- and MIME 4000 with a minimum grade of D-)

Term Offered: Fall

CIVE 4750 Senior Design Projects
[0-3 credit hours (0-2, 0-2, 0)]
To provide real world civil engineering design experience through a design problem as would be developed in an actual civil engineering consultant’s office.

Term Offered: Spring, Fall

CIVE 4900 Seminars In Civil Engineering
[1-3 credit hours (0-3, 0, 0)]
An opportunity for qualified upperclassmen to pursue a relevant area of Civil Engineering of particular personal interest under the supervision of a faculty member.

Term Offered: Spring, Summer, Fall

CIVE 4990 Special Topics - Independent Study
[1-3 credit hours (0, 0, 1-3)]
An opportunity for a qualified upper class person to pursue a relevant area of Civil Engineering under the supervision of a faculty member.